

CLAIMS

1. A non-aqueous electrolytic solution for a lithium secondary battery which comprises an electrolyte salt 5 in a non-aqueous solvent, which contains a tert-alkylbenzene compound in an amount of 0.1 to 10 wt.% based on an amount of the solution and which further contains a benzene compound having a benzene ring substituted with a hydrocarbon group having 1 to 4 carbon atoms 10 via at least one tertiary carbon atom, in an amount of 0.001 to 0.5 wt.% based on the amount of the solution.

2. The non-aqueous electrolytic solution of claim 1, wherein the tert-alkylbenzene compound is tert-15 butylbenzene, and the benzene compound having the benzene ring substituted with the hydrocarbon group having 1 to 4 carbon atoms via at least one tertiary carbon atom comprises sec-butylbenzene and/or isopropylbenzene.

20 3. The non-aqueous electrolytic solution of claim 1, wherein the tert-alkylbenzene compound is tert-pentylbenzene, and the benzene compound having the benzene ring substituted with the hydrocarbon group having 1 to 4 carbon atoms via at least one tertiary carbon atom 25 comprises isopropylbenzene, 1,2-dimethylpropylbenzene, 1,2-dimethylindan, 1,3-dimethylindan, and/or 1-methyltetrahydronaphthalene.

30 4. The non-aqueous electrolytic solution of claim 1, wherein the tert-alkylbenzene compound is 1,3-di-tert-butylbenzene, and the benzene compound having the benzene ring substituted with the hydrocarbon group having 1 to 4 carbon atoms via at least one tertiary carbon atom is 1-tert-butyl-3-isopropylbenzene.

5. The non-aqueous electrolytic solution of claim 1, wherein the tert-alkylbenzene compound is 1,4-di-tert-butylbenzene, and the benzene compound having the benzene ring substituted with the hydrocarbon group having 1 to 4 5 carbon atoms via at least one tertiary carbon atom is 1-tert-butyl-4-isopropylbenzene.

10 6. The non-aqueous electrolytic solution of claim 1, wherein the tert-alkylbenzene compound is 4-fluoro- 10 tert-butylbenzene, and the benzene compound having the benzene ring substituted with the hydrocarbon group having 1 to 4 carbon atoms via at least one tertiary carbon atom comprises 4-fluoro-isopropylbenzene and/or 4-fluoro-sec-butylbenzene.

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20 7. The non-aqueous electrolytic solution of claim 1, wherein the tert-alkylbenzene compound is 4-tert-butylbiphenyl, and the benzene compound having the benzene ring substituted with the hydrocarbon group having 1 to 4 carbon atoms via at least one tertiary carbon atom 20 is 4-sec-butylbiphenyl.

25 8. The non-aqueous electrolytic solution of claim 1, wherein the tert-alkylbenzene compound is 1,3-di-tert-pentylbenzene, and the benzene compound having the benzene ring substituted with the hydrocarbon group having 1 to 4 carbon atoms via at least one tertiary carbon atom 25 is 1-tert-pentyl-3-isopropylbenzene.

30 9. The non-aqueous electrolytic solution of claim 1, wherein the tert-alkylbenzene compound is 1,4-di-tert-pentylbenzene, and the benzene compound having the benzene ring substituted with the hydrocarbon group having 1 to 4 carbon atoms via at least one tertiary carbon atom 35 is 1-tert-pentyl-4-isopropylbenzene.

10. The non-aqueous electrolytic solution of claim 1, wherein the tert-alkylbenzene compound is 1-tert-butyl-4-tert-pentylbenzene, and the benzene compound having the benzene ring substituted with the hydrocarbon group having 1 to 4 carbon atoms via at least one tertiary carbon atom is 1-tert-butyl-4-isopropylbenzene.

11. A lithium secondary battery comprising a positive electrode, a negative electrode and a non-aqueous electrolytic solution comprising an electrolyte salt in a non-aqueous solvent, wherein the non-aqueous electrolytic solution is the non-aqueous electrolytic solution defined in claim 1.

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12. A method for preparing a pure tert-alkylbenzene compound, which comprises subjecting a reaction product which is obtained by alkylation of a benzene compound and which contains a benzene compound having a benzene ring substituted with a hydrocarbon group having 1 to 4 carbon atoms via at least one tertiary carbon atom to photo-halogenation.